



MEMORANDUM

To: Village of Orland Park

From: Taylor Eschbach, P.E.
Kimley-Horn and Associates, Inc.

Date: October 11, 2022

Re: ***Proposed Silver Cross Medical Office Building Development
Northeast Corner of LaGrange Road and 171st Street
Orland Park, Illinois***

Introduction

Kimley-Horn and Associates, Inc., serves as the engineering consultant for Silver Cross Hospital who is proposing to construct a two-story medical office building with associated surface parking, landscaping, amenity areas, and utilities. The sitework includes demolition, grading, storm sewer, watermain, sanitary sewer, and paving installation.

This approximately 7.78-acre parcel was included in the previously approved Orland Ridge PUD and was included in the sizing of the regional stormwater management facilities directly east of the subject property. It has been discussed with the Village that the proposed development should be compared to what was previously shown on this parcel in the approved PUD and that the updated rainfall data should also be taken into account.

Existing Conditions

The existing site has been mass graded as part of the Orland Ridge development and currently drains via sheetflow to the east into the regional detention area before ultimately outfalling to the north into the existing lake. There is not any existing storm sewer on the subject parcel.

In the existing condition there is minimal impervious area on-site; however, for the purposes of this drainage investigation, the Site Plan included in the previously approved PUD is the basis of comparison to the proposed development. The attached Orland Ridge Proposed Drainage Plan dated 02/14/20 shows the conceptual commercial development and assumed curve numbers that was included in the original sizing of the regional SWM facilities.

Proposed Conditions

In the proposed condition, a medical office building with associated surface parking will be constructed on the southern half of the property along with a driveway connection to 169th Place. The proposed development will include underground storm sewer to collect stormwater runoff and convey it to the east into the regional stormwater management facilities. The proposed condition will provide a significant reduction in impervious coverage from the previously approved Orland Ridge conceptual commercial Site Plan. This proposed impervious coverage can be seen on the attached Silver Cross MOB – Proposed Drainage Exhibit.

Comparison to Previously Approved Drainage Design

In the previously approved design, the commercial parcel was divided into two sub catchments. The northern drainage area is tributary to Basin A2 and the southern drainage area is tributary to Basin A1 and the preserved wetland area which function in tandem. A hydrologic model was run using HydroCAD and the original design parameters to confirm the runoff generated by this parcel in the original design.

A second HydroCAD model was created to compare the site's proposed condition with the new impervious coverage and utilizing the updated rainfall data. The results are shown below:

Project: Silver Cross MOB at Orland Park

Date: 5/6/22

By: WAW



PREVIOUSLY APPROVED VS. PROPOSED HYDROLOGY CONDITIONS								
PREVIOUSLY APPROVED CONDITIONS					PROPOSED CONDITIONS			
	STORM EVENT*	Rainfall Depth (in)	Inflow (CFS)	VOLUME (ac-ft)	Rainfall Depth (in)	Inflow (CFS)	VOLUME	% OF APPROVED VOLUME
North	2-YR, 24-HR	3.10	0.75	0.48	3.34	0.47	0.25	52%
Basin A2	100-YR, 24-HR	7.58	1.95	1.31	8.57	1.89	1.13	87%
South	2-YR, 24-HR	3.10	1.70	1.07	3.34	1.52	0.88	82%
Basin A1	100-YR, 24-HR	7.58	4.39	2.92	8.57	4.76	3.02	103%

2-YR, 24-HR PROPOSED CONDITION REQUIRED VOLUME	=	1.13 ac-ft
2-YR, 24-HR PREVIOUSLY APPROVED VOLUME	=	1.55 ac-ft
Net Volume	=	-0.42 ac-ft (surplus)
100-YR, 24-HR PROPOSED CONDITION REQUIRED VOLUME	=	4.15 ac-ft
100-YR, 24-HR PREVIOUSLY APPROVED VOLUME	=	4.22 ac-ft
Net Volume	=	-0.07 ac-ft (surplus)

Conclusion

As shown in the comparison table above, there is excess storage available during both the 2-year and 100-year storm events. In summary, the reduction in the proposed impervious coverage is more than offsetting the increase in the rainfall data. Therefore, it is determined that the existing stormwater management facilities have sufficient capacity to provide for the proposed development.

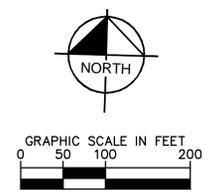
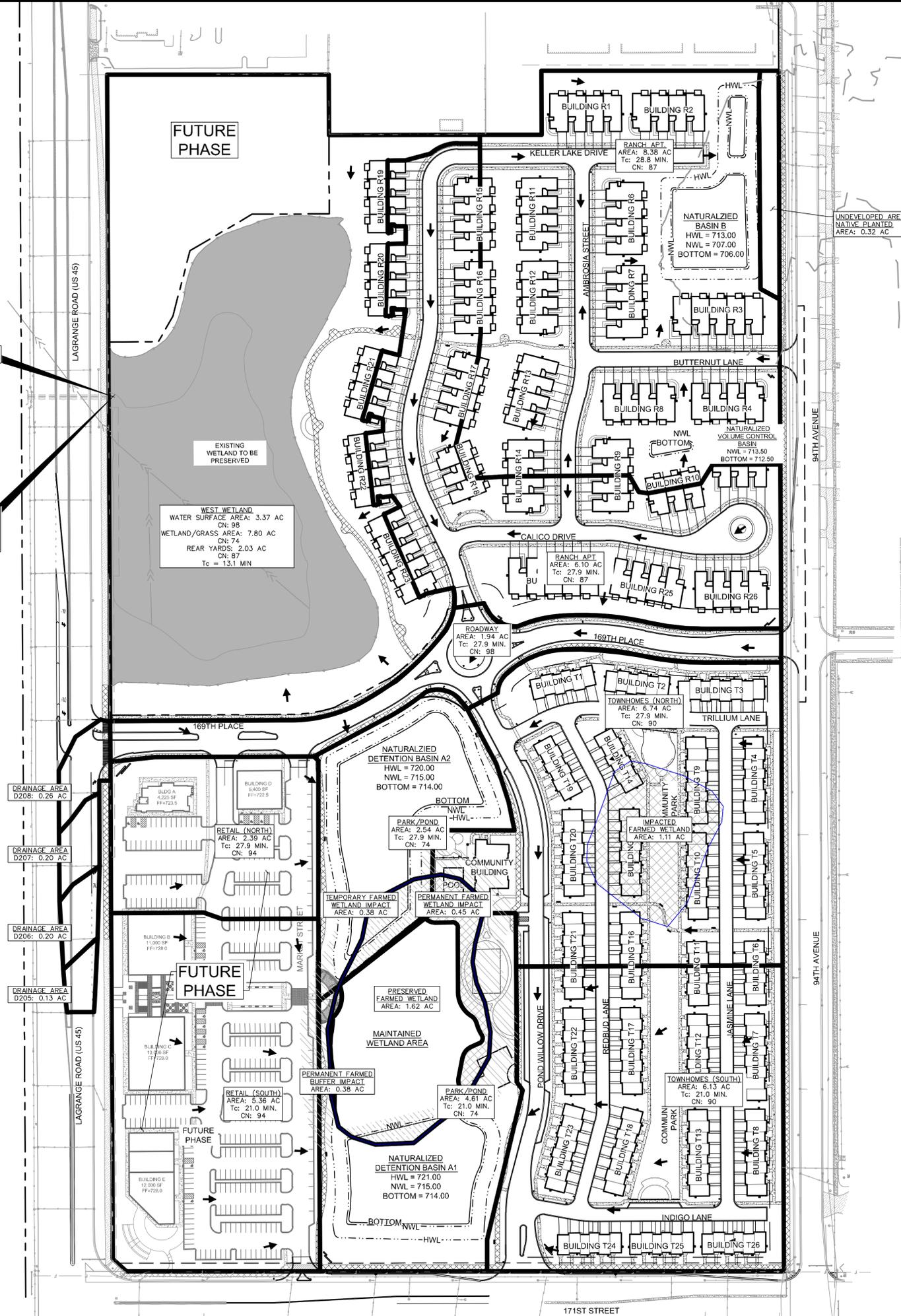
Attachments

- Orland Ridge – Proposed Drainage Plan
- HydroCAD Model – Excerpt from Approved Orland Ridge Model
- Silver Cross MOB – Proposed Drainage Exhibit
- HydroCAD Model – Silver Cross MOB Model With New Rainfall Data
- Silver Cross MOB – Drainage Area Map
- Hydraflow Summary – Capacity & Velocity Analysis
- Hydraflow Profiles – HGL Analysis

Drawing name: K:\GIS_LIEV\168626000_SR_Jacobson_Orland Park, IL\2 Design\CAD\Plansheets\Final Engineering\C10.1 - PROPOSED DRAINAGE PLAN.dwg C10.1 Feb 13, 2020 4:48pm by TaylorEichenbach
 This document, together with the concepts and designs presented herein, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

***PROPOSED OUTFLOW (CRITICAL DURATION)**
 2-YR = 9.28 CFS (12-HR)
 10-YR = 14.99 CFS (12-HR)
 50-YR = 23.24 CFS (12-HR)
 100-YR = 27.45 CFS (12-HR)

***NOTE: OUTFLOW BASED ON MODIFIED ON-SITE DETENTION CONDITION IN ORDER TO PRESERVE WETLAND HYDROLOGY.**



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LEGEND

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- XXX---
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EXISTING CONTOUR
 PROPOSED CONTOUR
 FLOW DIRECTION
 PRESERVED WETLAND FOOTPRINT
 IMPACTED WETLAND LIMITS

Proposed Tributary	Area
Townhomes (South)	6.13
Retail (South)	5.36
Park/Pond	4.61
Park/Pond	2.54
Townhomes (North)	6.74
Retail (North)	2.39
Roadway	1.94
Ranch Apt	6.10
Ranch Apt	8.38
Undeveloped Area	0.32
West Wetland Water	3.37
West Wetland Grassed Area	7.80
Rear Yards	2.03
Total	57.71

REVISED PER VILLAGE/CCDOT COMMENTS	DATE	BY
ADDENDUM 1 - LANDSCAPE	02/14/20	WAW
REVISED PER IDOT COMMENTS	02/06/20	SKA
LANDSCAPE REV PER VILLAGE COMMENTS	02/05/20	WAW
REVISED PER VILLAGE/MWRD/CCDOT COM.	07/09/20	WAW
REVISED PER CCODT COMMENTS	12/20/19	WAW
REVISED PER VILLAGE/MWRD COMMENTS	11/21/19	WAW
REVISED PER VILLAGE/MWRD COMMENTS	10/15/19	WAW

Kimley»Horn
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 Lisle, IL 60532, P: 630.582.4550
 WWW.KIMLEY-HORN.COM

SCALE: AS NOTED
 DESIGNED BY: TRE
 DRAWN BY: JDC
 CHECKED BY: WAW

SR.JACOBSON
 CONSULTING ENGINEERS

PROPOSED DRAINAGE PLAN

ORLAND RIDGE
 LAGRANGE ROAD & 171 ST STREET
 ORLAND PARK, IL 60487

ORIGINAL ISSUE:
 07/17/2019
 KHA PROJECT NO.
 168626000
 SHEET NUMBER

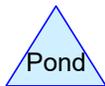
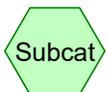
C10.1



Retail (North)



Retail (South)



Routing Diagram for 2022-0506 Excerpt From Approved Orland Ridge Model

Prepared by Kimley-Horn, Printed 5/6/2022

HydroCAD® 10.10-5a s/n 09843 © 2020 HydroCAD Software Solutions LLC

2022-0506 Excerpt From Approved Orland Ridge Model

Prepared by Kimley-Horn

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 YR-24 HR	Huff 0-10sm	3Q	Scale	24.00	1	3.10	2
2	100 YR-24 HR	Huff 0-10sm	3Q	Scale	24.00	1	7.58	2

2022-0506 Excerpt From Approved Orland Ridge Model

Prepared by Kimley-Horn

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.750	94	Urban commercial, 85% imp, HSG C (R(N), R(S))
7.750	94	TOTAL AREA

Summary for Subcatchment R(N): Retail (North)

Runoff = 0.75 cfs @ 15.89 hrs, Volume= 0.479 af, Depth> 2.41"

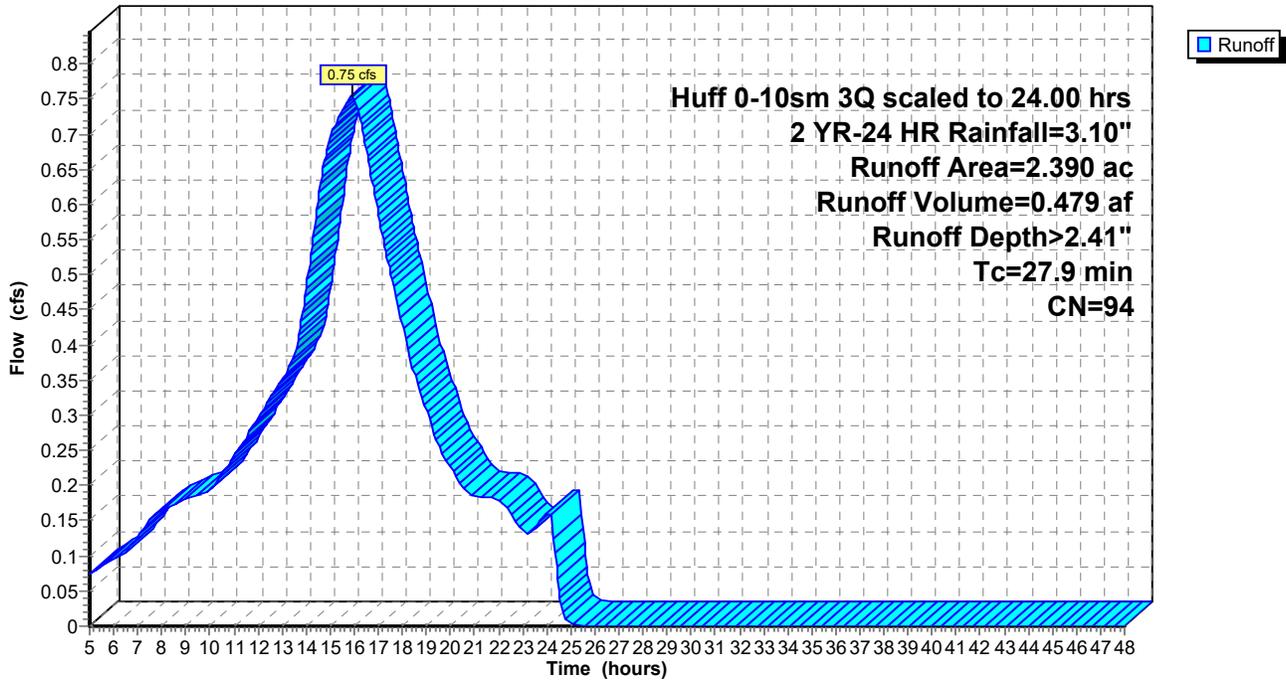
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 2 YR-24 HR Rainfall=3.10"

Area (ac)	CN	Description
2.390	94	Urban commercial, 85% imp, HSG C
0.358		15.00% Pervious Area
2.031		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9					Direct Entry, From Approved Report

Subcatchment R(N): Retail (North)

Hydrograph



Summary for Subcatchment R(S): Retail (South)

Runoff = 1.70 cfs @ 15.82 hrs, Volume= 1.073 af, Depth> 2.40"

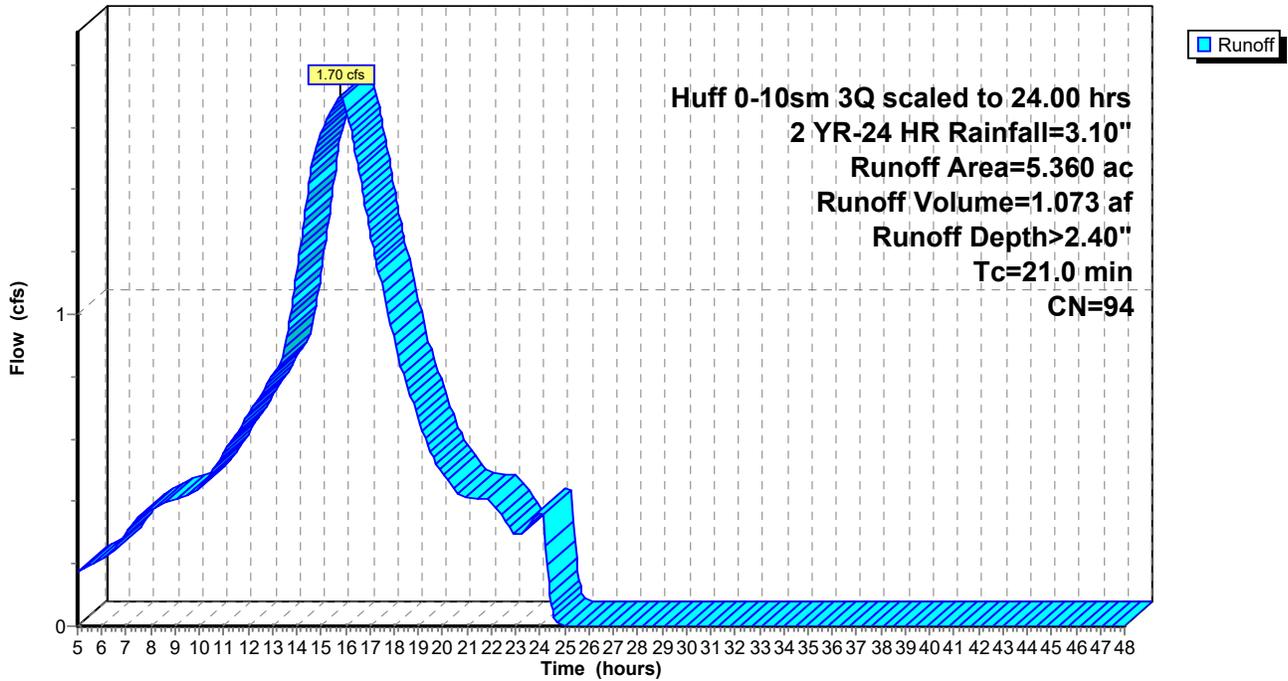
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 2 YR-24 HR Rainfall=3.10"

Area (ac)	CN	Description
5.360	94	Urban commercial, 85% imp, HSG C
0.804		15.00% Pervious Area
4.556		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0					Direct Entry, From Approved Report

Subcatchment R(S): Retail (South)

Hydrograph



Summary for Subcatchment R(N): Retail (North)

Runoff = 1.95 cfs @ 15.87 hrs, Volume= 1.305 af, Depth> 6.55"

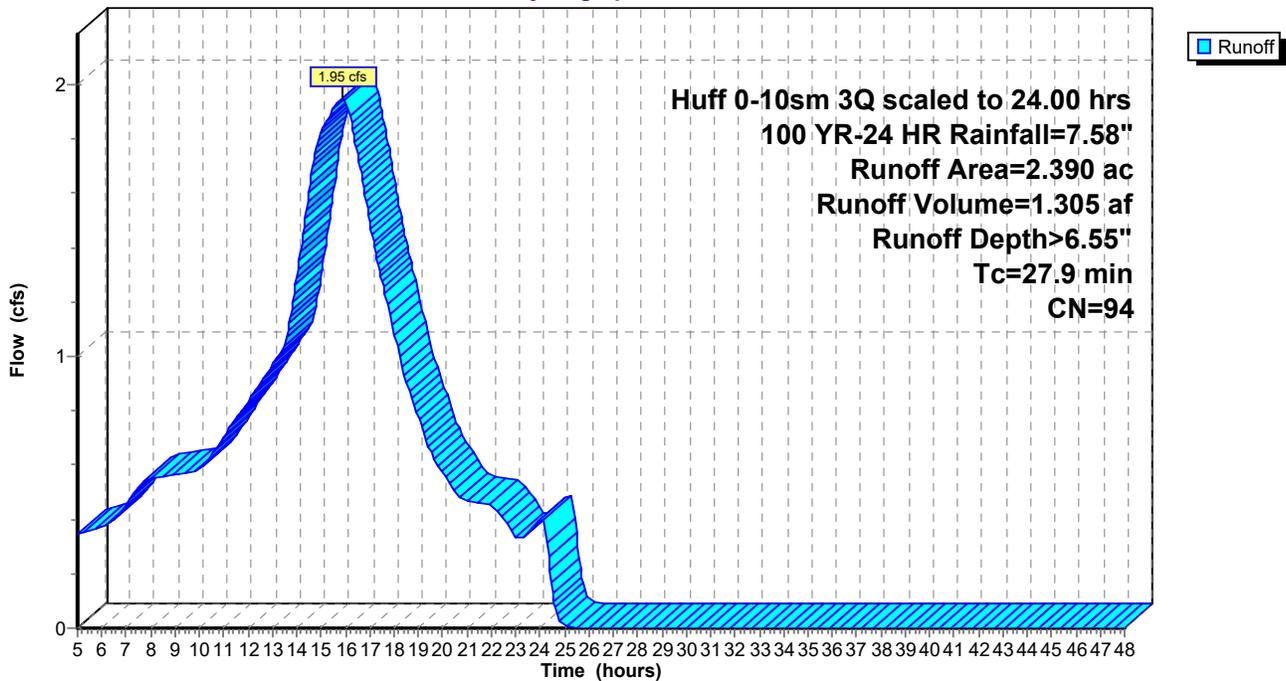
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 100 YR-24 HR Rainfall=7.58"

Area (ac)	CN	Description
2.390	94	Urban commercial, 85% imp, HSG C
0.358		15.00% Pervious Area
2.031		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9					Direct Entry, From Approved Report

Subcatchment R(N): Retail (North)

Hydrograph



Summary for Subcatchment R(S): Retail (South)

Runoff = 4.39 cfs @ 15.80 hrs, Volume= 2.919 af, Depth> 6.54"

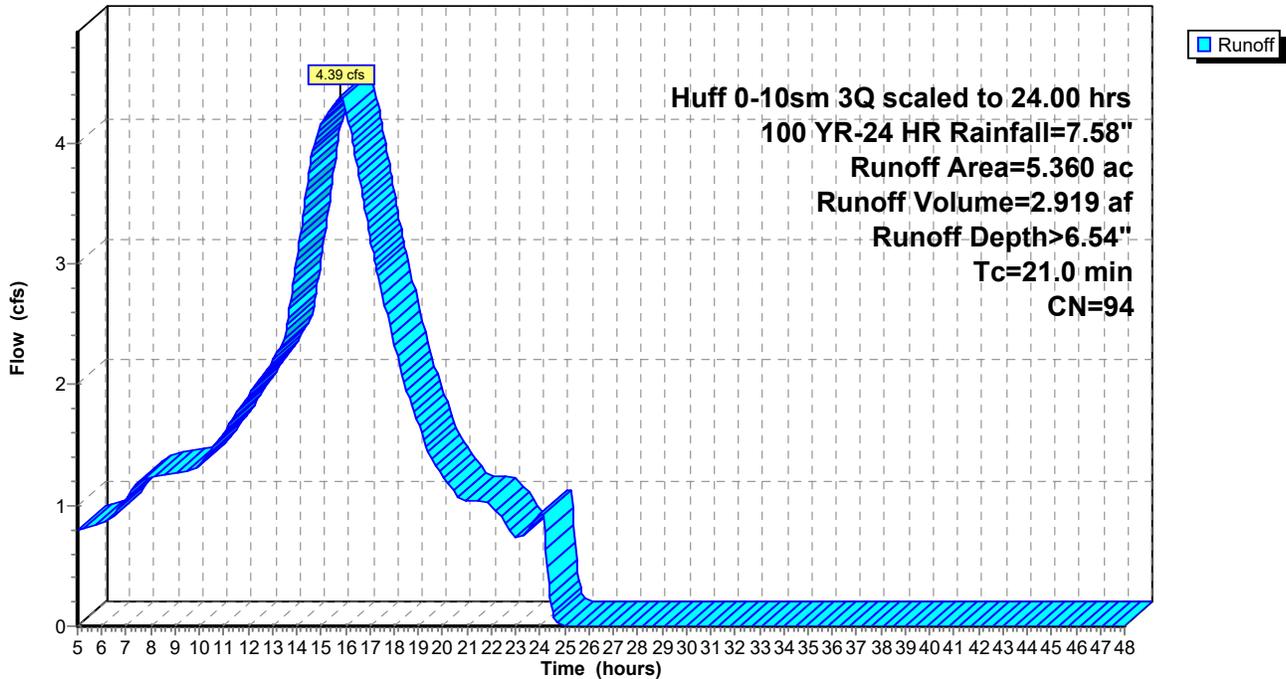
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 100 YR-24 HR Rainfall=7.58"

Area (ac)	CN	Description
5.360	94	Urban commercial, 85% imp, HSG C
0.804		15.00% Pervious Area
4.556		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0					Direct Entry, From Approved Report

Subcatchment R(S): Retail (South)

Hydrograph

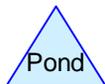
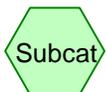




Retail (North)



Retail (South)



Routing Diagram for 2022-0506 Silver Cross MOB Model With New Rainfall Data

Prepared by Kimley-Horn & Associates, Printed 7/11/2022

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2022-0506 Silver Cross MOB Model With New Rainfall Data

Prepared by Kimley-Horn & Associates

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 YR-24 HR	Huff 0-10sm	3Q	Scale	24.00	1	3.34	2
2	100 YR-24 HR	Huff 0-10sm	3Q	Scale	24.00	1	8.57	2

2022-0506 Silver Cross MOB Model With New Rainfall Data

Prepared by Kimley-Horn & Associates

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.890	74	>75% Grass cover, Good, HSG C (R(N), R(S))
2.890	98	Paved parking, HSG C (R(N), R(S))

Summary for Subcatchment R(N): Retail (North)

Runoff = 0.47 cfs @ 16.03 hrs, Volume= 0.250 af, Depth= 1.25"

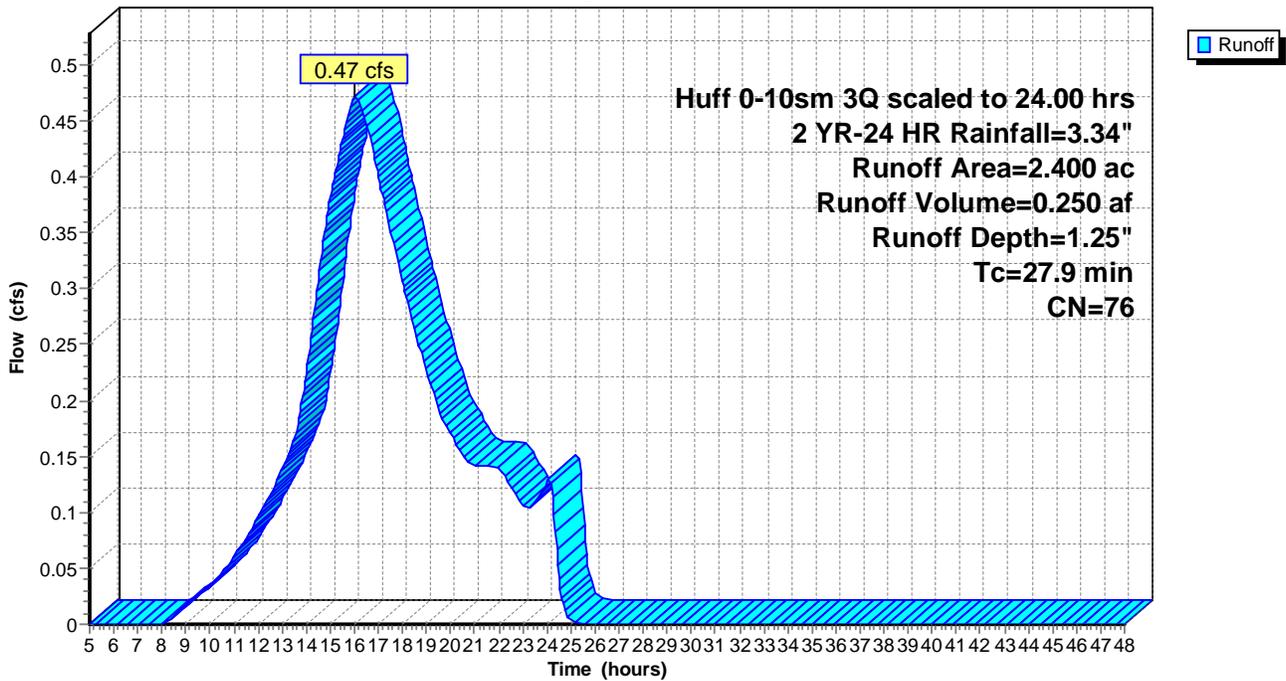
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 2 YR-24 HR Rainfall=3.34"

Area (ac)	CN	Description
0.190	98	Paved parking, HSG C
2.210	74	>75% Grass cover, Good, HSG C
2.400	76	Weighted Average
2.210		92.08% Pervious Area
0.190		7.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9					Direct Entry, From Approved Report

Subcatchment R(N): Retail (North)

Hydrograph



Summary for Subcatchment R(S): Retail (South)

Runoff = 1.52 cfs @ 15.86 hrs, Volume= 0.877 af, Depth> 1.96"

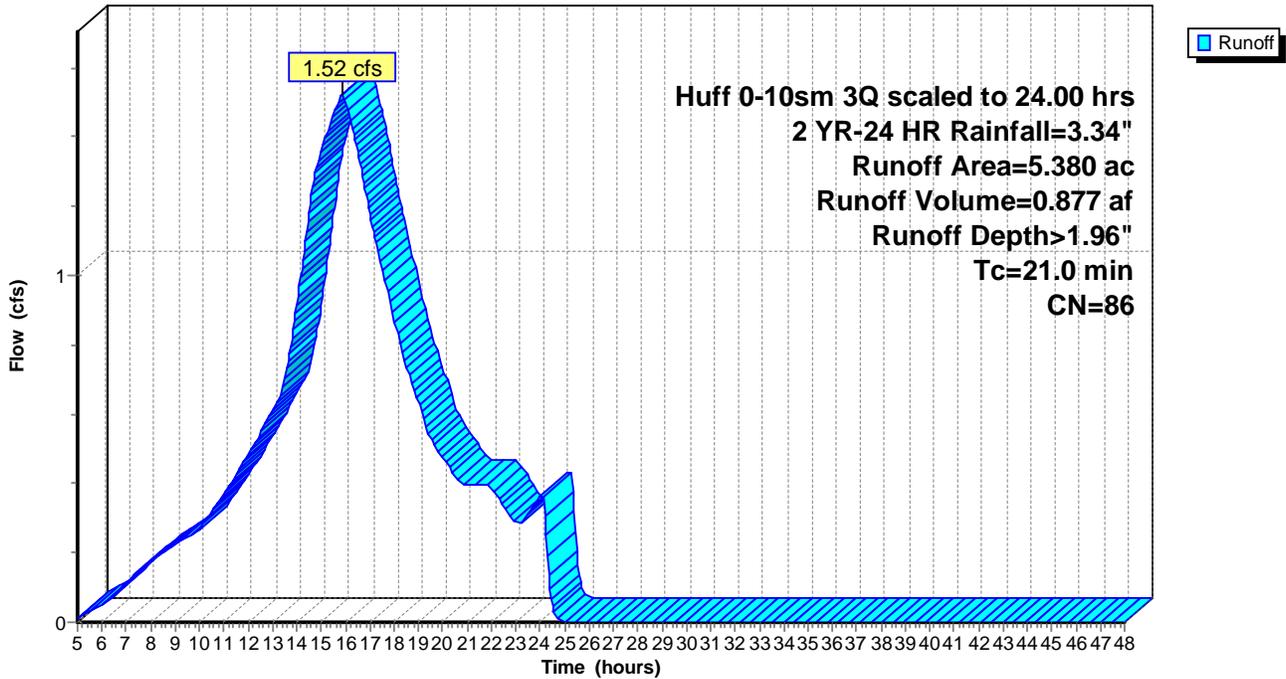
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 2 YR-24 HR Rainfall=3.34"

Area (ac)	CN	Description
2.700	98	Paved parking, HSG C
2.680	74	>75% Grass cover, Good, HSG C
5.380	86	Weighted Average
2.680		49.81% Pervious Area
2.700		50.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0					Direct Entry, From Approved Report

Subcatchment R(S): Retail (South)

Hydrograph



Summary for Subcatchment R(N): Retail (North)

Runoff = 1.89 cfs @ 15.92 hrs, Volume= 1.133 af, Depth> 5.66"

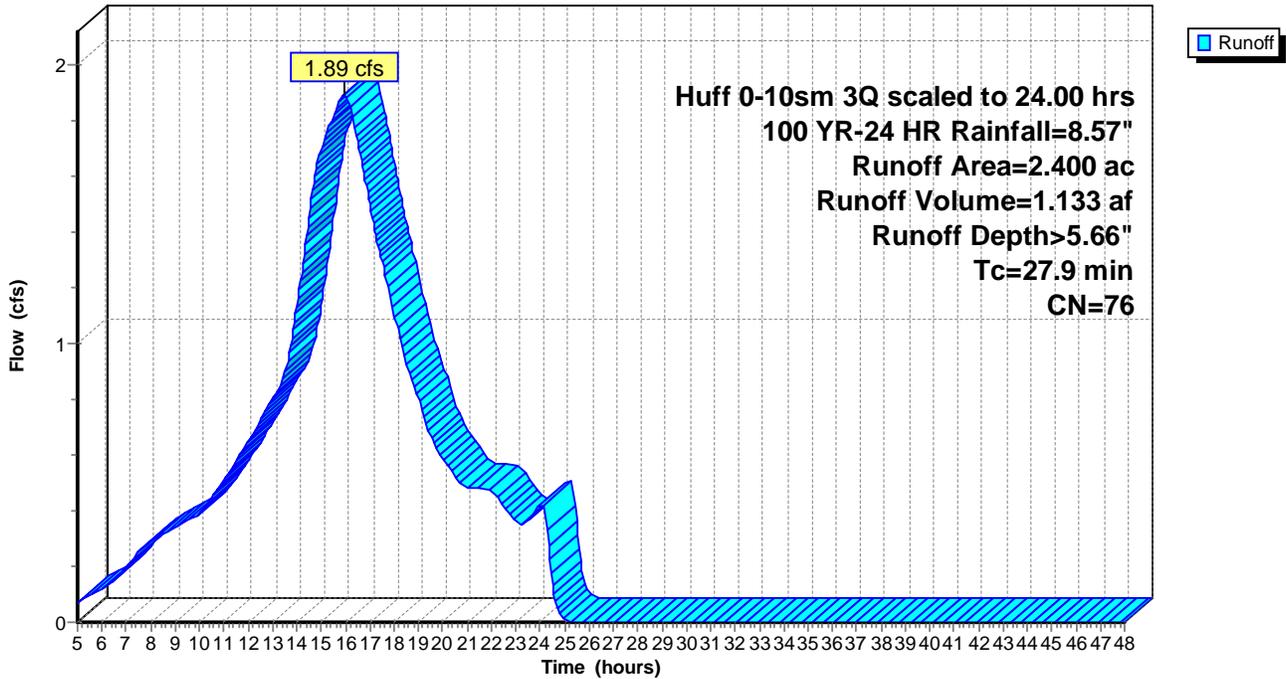
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 100 YR-24 HR Rainfall=8.57"

Area (ac)	CN	Description
0.190	98	Paved parking, HSG C
2.210	74	>75% Grass cover, Good, HSG C
2.400	76	Weighted Average
2.210		92.08% Pervious Area
0.190		7.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9					Direct Entry, From Approved Report

Subcatchment R(N): Retail (North)

Hydrograph



Summary for Subcatchment R(S): Retail (South)

Runoff = 4.76 cfs @ 15.82 hrs, Volume= 3.023 af, Depth> 6.74"

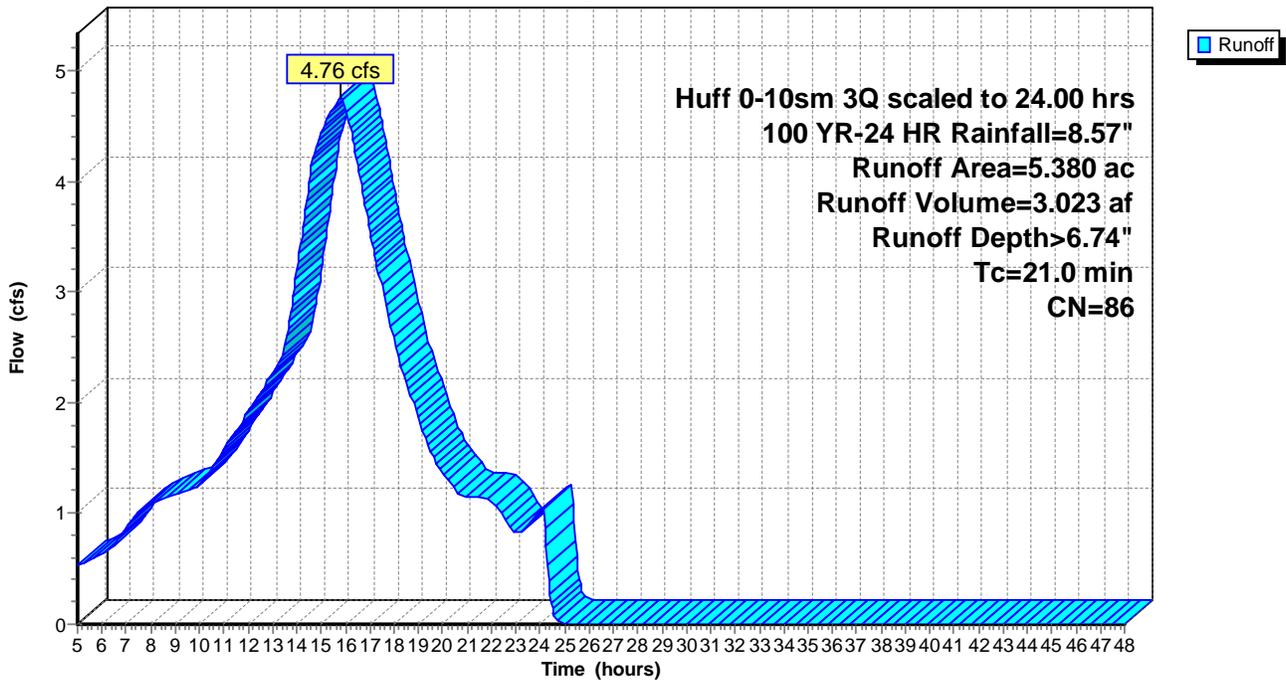
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q scaled to 24.00 hrs 100 YR-24 HR Rainfall=8.57"

Area (ac)	CN	Description
2.700	98	Paved parking, HSG C
2.680	74	>75% Grass cover, Good, HSG C
5.380	86	Weighted Average
2.680		49.81% Pervious Area
2.700		50.19% Impervious Area

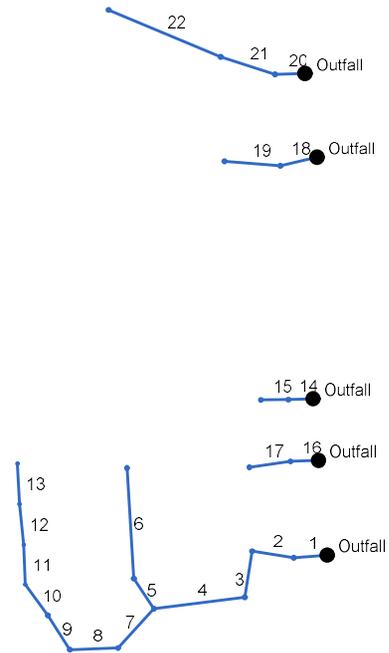
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0					Direct Entry, From Approved Report

Subcatchment R(S): Retail (South)

Hydrograph



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	43.898	0.33	2.17	0.85	0.28	1.66	10.0	25.8	4.2	6.91	12.88	6.42	18	1.50	719.56	720.22	720.34	721.24	721.35	724.08	D2 TO D1
2	1	55.011	0.21	1.84	0.80	0.17	1.38	10.0	25.6	4.2	5.77	12.82	5.07	18	1.49	720.32	721.14	721.24	722.07	724.08	726.01	D3 TO D2
3	2	61.124	0.51	1.63	0.75	0.38	1.21	10.0	25.3	4.2	5.09	10.49	5.04	18	1.00	721.26	721.87	722.07	722.74	726.01	725.89	D4 TO D3
4	3	119.777	0.00	1.12	0.00	0.00	0.83	0.0	24.6	4.3	3.54	7.43	4.05	18	0.50	721.97	722.57	722.74	723.29	725.89	730.34	D5 TO D4
5	4	47.385	0.26	0.51	0.85	0.22	0.43	10.0	11.4	6.2	2.67	4.60	3.89	15	0.51	726.54	726.78	727.23	727.46	730.34	730.48	D6 TO D5
6	5	145.082	0.25	0.25	0.85	0.21	0.21	10.0	10.0	6.5	1.38	2.53	3.25	12	0.50	727.03	727.76	727.59	728.26	730.48	730.91	D7 TO D6
7	4	69.702	0.22	0.61	0.65	0.14	0.39	10.0	24.0	4.3	1.70	4.58	2.92	15	0.50	722.82	723.17	723.54	723.69	730.34	729.58	D8 TO D5
8	7	63.000	0.25	0.39	0.65	0.16	0.25	10.0	23.5	4.4	1.10	2.50	3.08	12	0.49	723.42	723.73	723.88	724.19	729.58	729.49	D9 TO D8
9	8	53.432	0.03	0.14	0.55	0.02	0.09	10.0	22.2	4.5	0.39	2.53	1.57	12	0.51	723.83	724.10	724.32	724.39	729.49	730.21	D10 TO D9
10	9	49.962	0.02	0.11	0.60	0.01	0.07	10.0	20.7	4.7	0.33	2.52	2.21	12	0.50	724.20	724.45	724.45	724.70	730.21	730.70	D11 TO D10
11	10	52.161	0.04	0.09	0.65	0.03	0.06	10.0	18.9	4.9	0.29	2.51	2.13	12	0.50	724.55	724.81	724.78	725.04	730.70	730.65	D12 TO D11
12	11	53.890	0.02	0.05	0.65	0.01	0.03	10.0	15.5	5.4	0.18	2.52	1.84	12	0.50	724.91	725.18	725.09	725.36	730.65	729.50	D13 TO D12
13	12	52.861	0.03	0.03	0.65	0.02	0.02	10.0	10.0	6.5	0.13	2.50	1.67	12	0.49	725.28	725.54	725.43	725.69	729.50	728.65	D27 TO D13
14	End	32.358	0.42	0.60	0.75	0.32	0.48	10.0	10.4	6.4	3.04	7.38	4.04	18	0.49	720.50	720.66	721.16	721.33	722.29	724.53	D18 TO D17
15	14	36.006	0.18	0.18	0.90	0.16	0.16	10.0	10.0	6.5	1.05	5.04	4.15	12	2.00	721.20	721.92	721.51	722.35	724.53	725.73	D19 TO D18
16	End	36.709	0.24	0.48	0.80	0.19	0.38	10.0	10.6	6.3	2.44	6.48	4.44	15	1.01	720.50	720.87	721.03	721.49	722.02	724.13	D15 TO D14
17	16	54.332	0.24	0.24	0.80	0.19	0.19	10.0	10.0	6.5	1.24	5.02	4.03	12	1.99	721.12	722.20	721.49	722.67	724.13	726.03	D16 TO D15
18	End	49.214	0.11	1.29	0.90	0.10	1.10	10.0	10.3	6.4	7.05	7.33	4.72	18	0.49	717.95	718.19	719.13	719.37	719.74	723.63	D21 TO D20
19	18	73.222	1.18	1.18	0.85	1.00	1.00	10.0	10.0	6.5	6.50	7.46	4.47	18	0.51	718.29	718.66	719.50	719.76	723.63	722.47	D22 TO D21
20	End	39.243	0.12	2.90	0.90	0.11	2.47	10.0	10.9	6.3	15.49	16.14	5.85	24	0.51	717.15	717.35	718.72	718.92	719.49	721.67	D24 TO D23
21	20	74.650	0.48	2.78	0.85	0.41	2.36	10.0	10.7	6.3	14.95	15.92	5.21	24	0.50	717.35	717.72	719.13	719.39	721.67	722.07	D25 TO D24
22	21	158.793	2.30	2.30	0.85	1.96	1.96	10.0	10.0	6.5	12.66	16.05	4.98	24	0.50	717.72	718.52	719.45	719.88	722.07	722.29	D26 TO D25

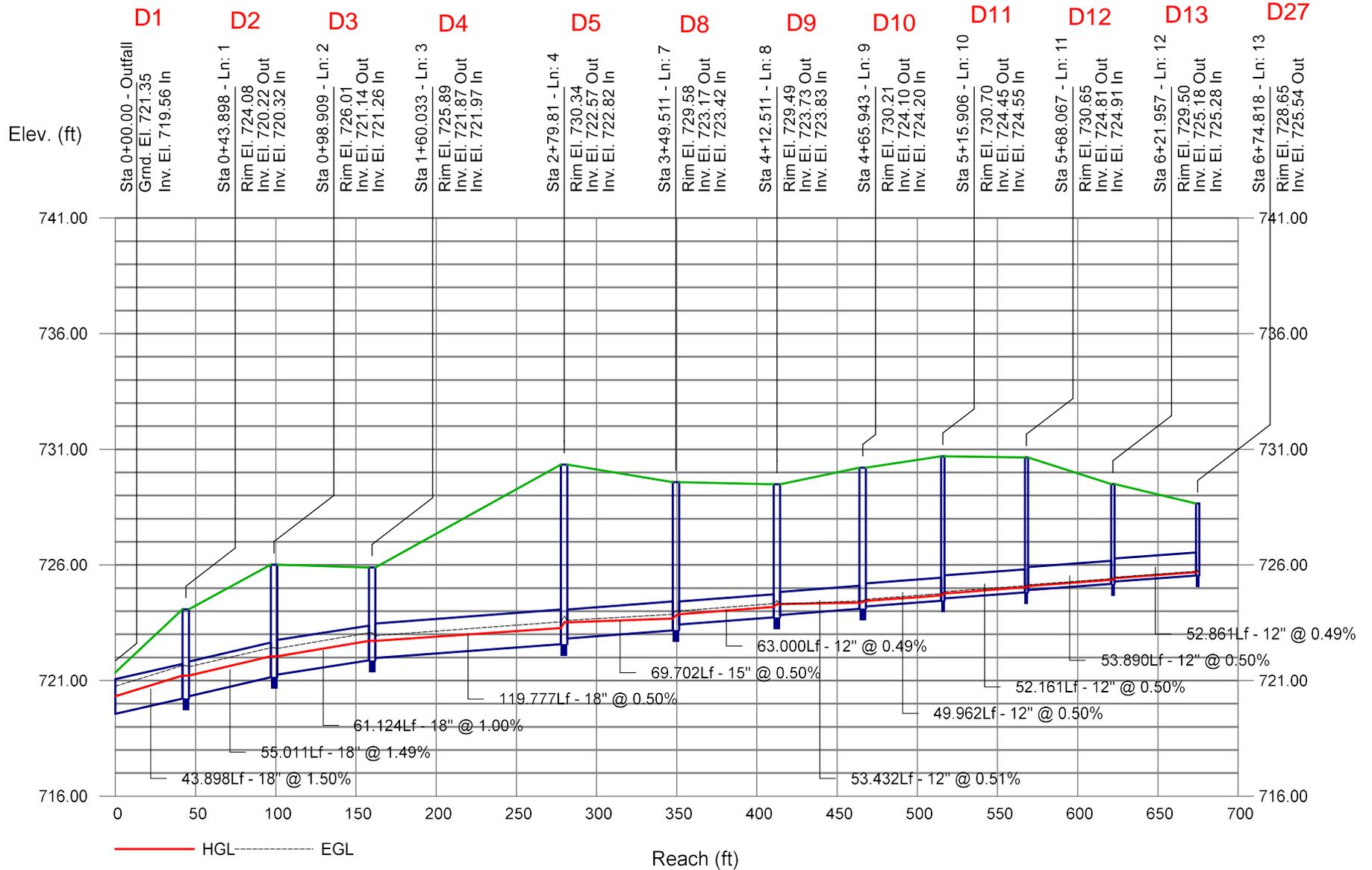
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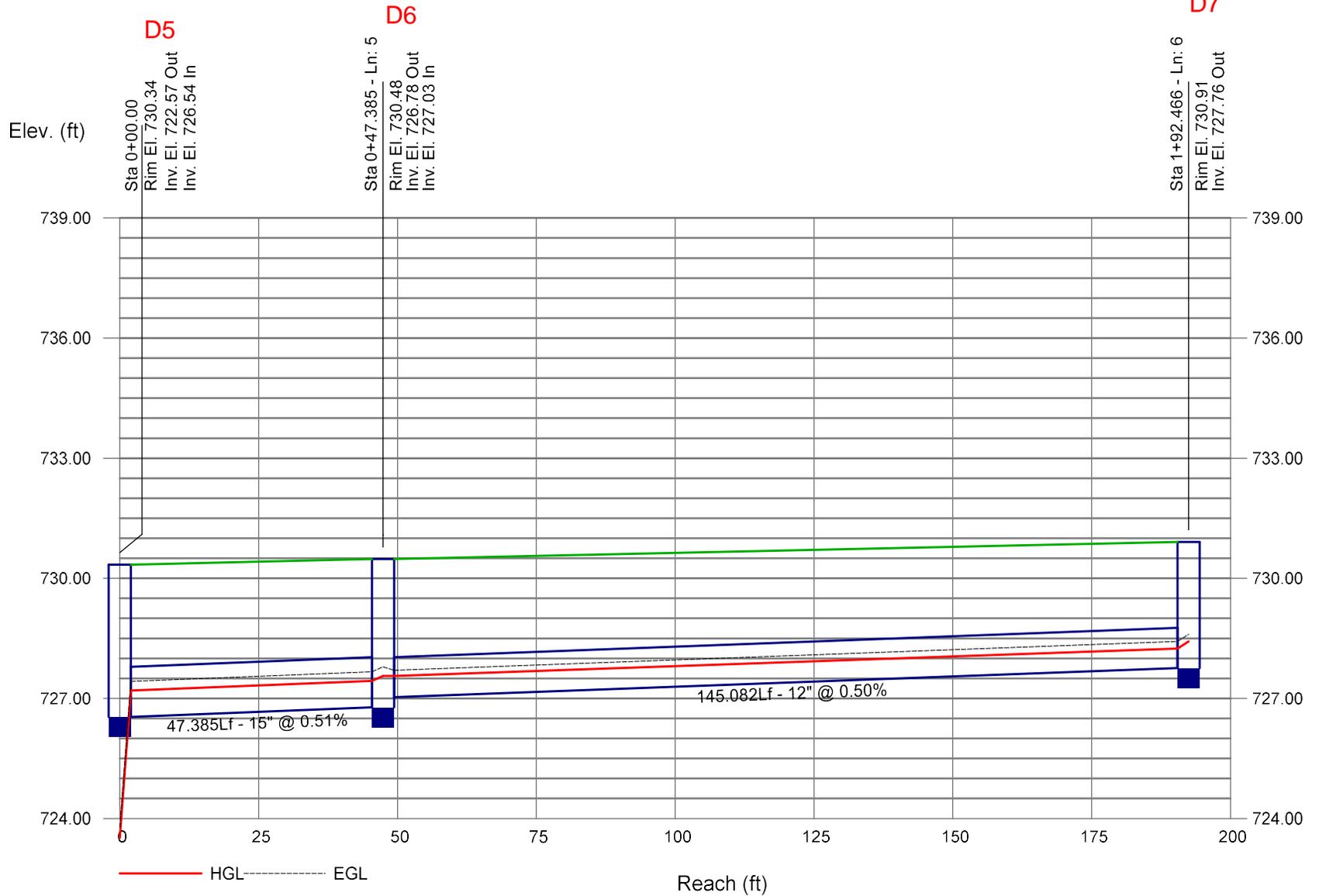
Run Date: 10/11/2022

NOTES: Intensity = 111.09 / (Inlet time + 14.60) ^ 0.89 Return period = Yrs. 10 ; c = cir e = ellip b = box

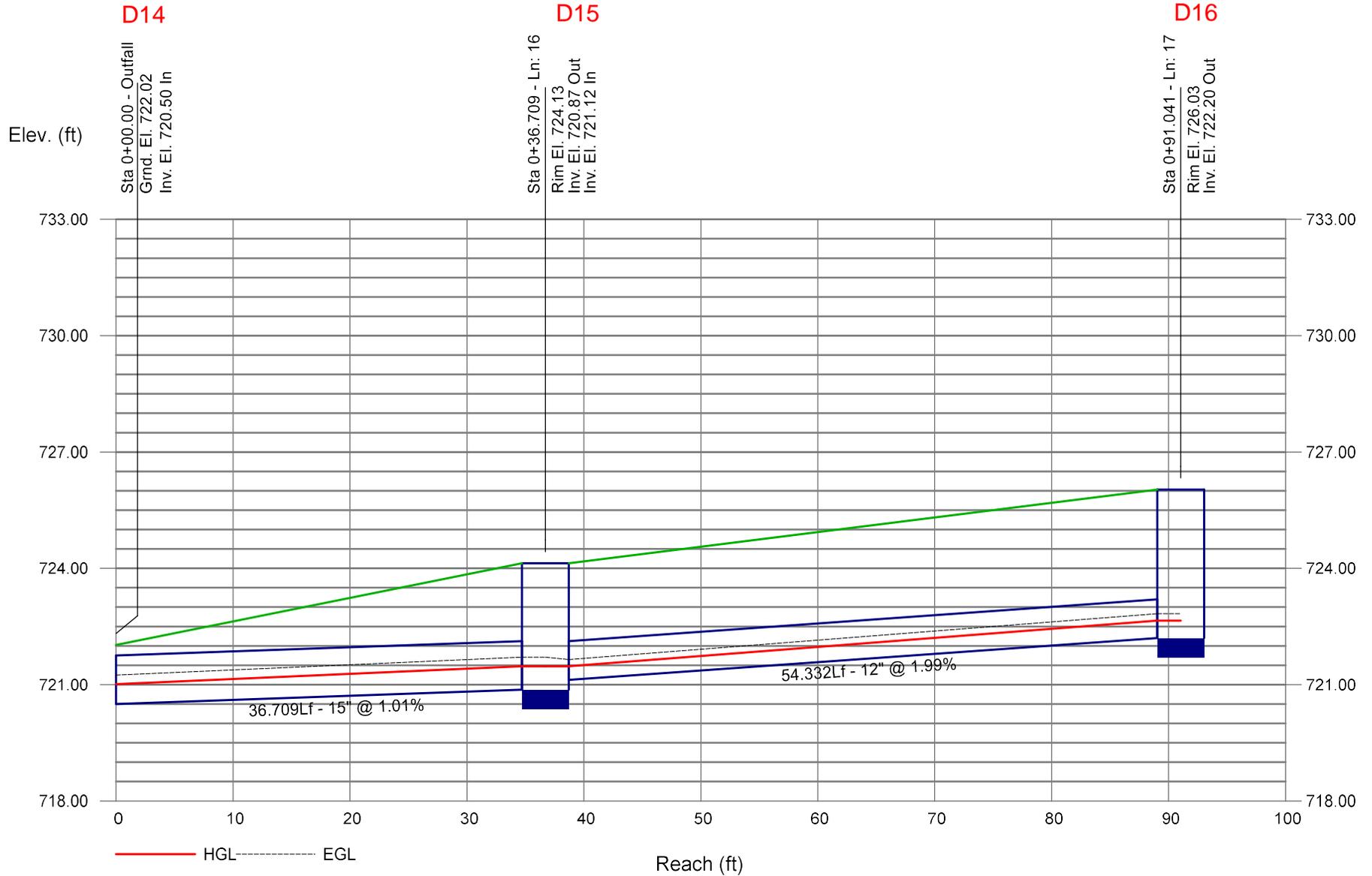
Storm Sewer Profile



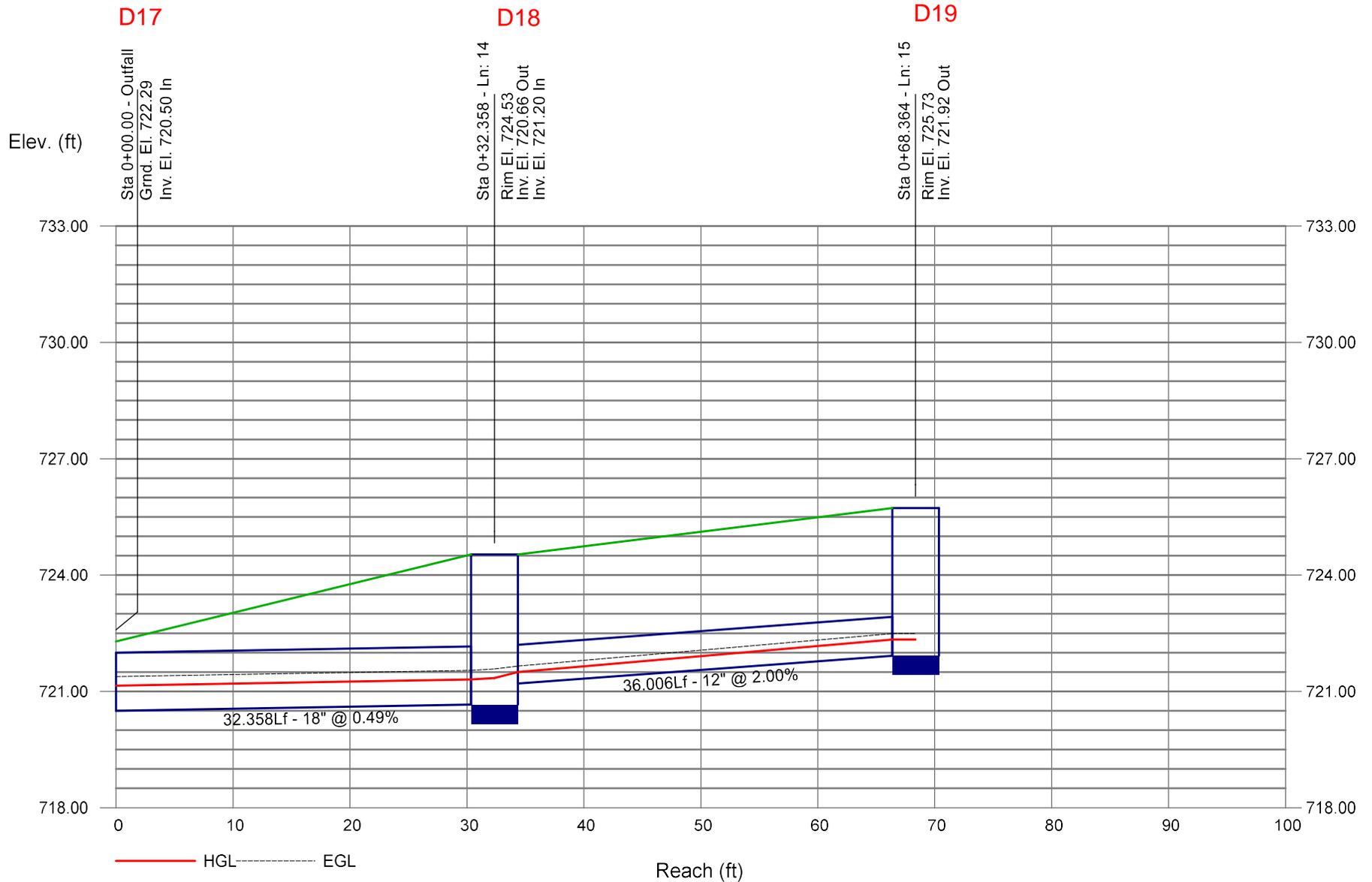
Storm Sewer Profile



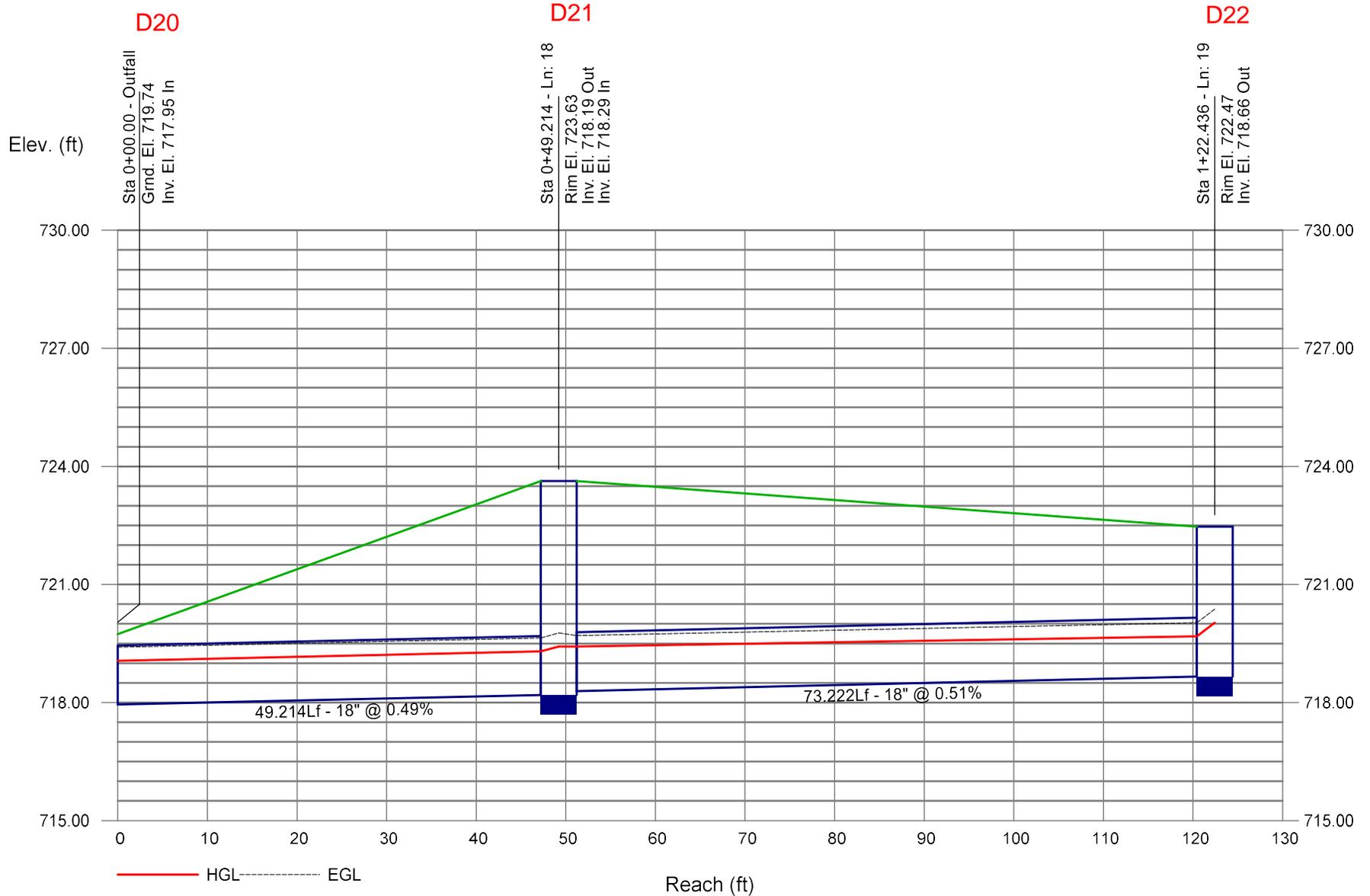
Storm Sewer Profile



Storm Sewer Profile



Storm Sewer Profile



Storm Sewer Profile

